Attachments:

1. *SW Handout*: ND Grease Rendering List.
2. *SW Handout*: ND Solid Waste Management Rules, Chapter 33-20-04.1, General Performance Standards.
3. Articles from BioCycle 12/94 - (1) Public/Private Initiatives: "Building Support for Composting in Agriculture;" and (2) On-Farm Management: "Poultry Industry Finds Added Value in Composting."
4. Article from Soil Conservation Service, 12/90 "Composting Facility No. 317."

Introduction. The North Dakota Department of Health generally regulates composting of solid waste, as specified in North Dakota Century Code Chapter 23-29 and North Dakota Administrative Code (NDAC) Article 33-20. Under the definitions included in Section 33-20-01.1-03 NDAC, composting is defined as, "the controlled biological decomposition of organic solid wastes under aerobic conditions." Additional information on the regulation of solid waste, including composting activities, as well as water protection under the North Dakota Solid Waste Management Rules includes the following:

< Chapter 33-20-02.1 Permit Provisions and Procedures;
< Chapter 33-20-03.1 Permit Application Provisions;
< Chapter 33-20-04.1 General Performance Standards; and
< Chapter 33-20-13 Water Protection Provisions.

To meet the requirements for the North Dakota Department of Health's (NDDH) compost standards, a compost pile must be carefully managed to maintain proper nutrient balance, oxygen content, temperature and moisture. Vector control must be addressed. Since some concern may arise due to leachate (water contaminated by waste products) migration as well as by odors and vectors, the Department generally requires that someone proposing a waste management facility submit a preapplication to determine the general suitability of the site for the proposed facility.

Alternatives. Composting problem wastes such as animal carcasses is difficult, as proper management takes careful planning, construction, operation and resources. Winter time compost operations may not be feasible. For many operators, it is probably cheaper and easier to try to reduce mortality (reduce the waste) and, as necessary, arrange for dead animals to be rendered (a list of grease renderers is attached). Local municipal solid waste landfills permitted by the Department are also available to handle dead animals (a list is available from the Department).

Section 33-20-03.1-01. A preapplication, submitted to the Department for review before the onset of any extensive facility design, normally consists of a preliminary facility description and a site assessment as follows:

1. The preliminary facility description must include, at a minimum: the location of the facility, a projection of capacity, size, daily waste receipts, type of waste accepted, years of operation, description of operation and costs, and a discussion of the proposed facility's compliance with local zoning requirements; and

2. The preliminary site assessment must include available information about the site's geology, hydrogeology, topography, soils, and hydrology, based on existing information.

The information provided in the preapplication should evaluate the appropriateness of the site, in view of the general location standards detailed in Section 33-20-04.1-01 of the solid waste management rules. In addition, the preapplication submitted to the Department should be aware of the requirements of Chapter 33-20-13 "Water Protection Provisions," however, exact details on the measures necessary for water protection would be discussed as part of the facility's preapplication review. The preapplication procedure allows the Department to interact with the proposed facility's owner/operator to provide guidance on site selection, facility construction, operation, etc., before extensive amounts of time and money are expended in the facility's planning.

Section 33-20-04.1-01 General location standards discuss site selection for solid waste facilities. Site selection for an animal carcass composting facility should be carefully considered to prevent or reduce potential contamination of surface water or groundwater resources. Leachate (contaminated water) generated from the waste decomposition process typically is contaminated with nitrogen, phosphorous, or microorganisms. Leachate may contaminate surface or groundwater resources. Site selection should involve an assessment of the proposed site's soil types, depth to groundwater, and distance to surface water. Compost facility site selection usually dictates the facility design necessary to protect surface water and groundwater from potential contamination. The Department may restrict establishment of animal composting facilities at some sites, based on potential impact of water resources. Approval of the site will help ensure that the composting facility operation maintains compliance with water protection provisions. Overall, the Department recommends the following criteria for siting an animal carcass composting facility:

1. Avoid sites underlain by sandy or gravelly (coarse textured) soils. These soils possess relatively large pore spaces that allow rapid water infiltration and movement. In the event that contaminated leachate is released during the composting operation, coarse textured soils act do not prevent transport of contaminants to groundwater resources. In many locations of the state, coarse textured soils are underlain by a water table or near-surface groundwater aquifer. These aquifers are particularly vulnerable to contamination from surface or near-

surface activities because the aquifer is "exposed" to the surface via coarse textured soils.

2. Avoid sites within a one hundred-year floodplain, within 200 feet of any surface water or wetland, or sites that are near or in ravines, channels, or woody draws.

Once a preapplication has been approved, the proposed facility's owner/operator may submit the additional details necessary to address any concerns arising due to the state solid waste management rules and the concerns expressed in the preapplication review.

In addition to the General Location Standards detailed above, Chapter 33-20-04.1 includes the general performance standards for solid waste management facilities. These additional sections in this chapter that are pertinent to composting activities include:

< Section 33-20-04.1-02 General Facility Standards;
< Section 33-20-04.1-03 Plan of Operation;
< Section 33-20-04.1-04 Record keeping and Reporting;
< Section 33-20-04.1-05 General Closure Standards; and
< Section 33-20-04.1-07 Piles Used for Storage and Treatment - Standards.

These sections are attached to this guideline and should be reviewed in detail by any proposer wishing to develop an animal waste composting facility. Some requirements may need more explanation than others. Some of the specific requirements may be applicable to other types of facilities such as a landfill (not applicable or NA) or may be simply answered in a one or two sentence statements. Some requirements will need careful explanation. To help the proposer for a facility, the following discussion is intended to help guide them through the various sections and requirements. Any proposer is also advised to work closely with the North Dakota Department of Agriculture, the National Resources Conservation Service (formerly the Soil Conservation Service) who has publications pertinent to animal waste composting and other technical resources.

Section 33-20-04.1-07. Piles used for storage and treatment detail some specific design and operating standards for compost systems. Design of the animal carcass composting facility will depend on the facility's size and method of operation. Careful facility design such as constructing a sturdy enclosure with a roof, rot-resistant walls and supports, screening, and an impervious floor can control moisture in the compost (thus preventing leachate generation and soil infiltration) as well as controlling vectors (flies, rats, skunks, snakes, etc.). Similarly, in-vessel composting systems can help ensure control of all parameters. Issues to be considered include:

1. Vector control.

2. Comply with the general facility standards of section 33-20-04.1-02 (partially discussed below).

3. Maintain the site including the removal of all solid waste, as necessary, and at closure to a permitted facility, or otherwise manage the waste that is in keeping with the purpose of this article. This part of the application should detail what will be done with the end product (compost) and what will be done in the event of system disruption and at closure.

4. Requirements for waste piles likely to produce a leachate, such as animal waste compost systems include:

    a. Depending on the site and the facility design and operation, the base of the compost operating area must be adequately lined with concrete, asphalt, specification-compacted clay, or an artificial liner to control or restrict downward migration of leachate. A liner thickness may be reduced if moisture can be carefully controlled and at sites that are underlain by thick deposits of clay-rich soil and a relatively deep water table. The liner or pad must be durable and large enough to allow the equipment to maneuver.

    b. Waste piles likely to produce a leachate must establish structures adequate to control run-on and run-off from a 24-hour, 25-year storm to prevent potential surface water or groundwater contamination. Permanently constructed and well maintained earthen berms of adequate design should be sufficient to control surface water run-on and run-off. The Department also recommends that the composting facility describe methods to manage contaminated run-off ponded within berms.

Based on site and waste characteristics, the department may require other environmental measures as listed.

Section 33-20-04.1-02, General facility standards require a facility owner/operator to provide for the training of facility personnel in procedures necessary for the specific facility and to provide for routine inspections of the facility.

In addition, the standards stipulate that all facilities shall comply with the water protection provisions, not cause a discharge of pollutants into the waters of the state, and not cause a violation of the ambient air quality standards or odor rules, Article 33-15, at the facility boundary.

A description of the equipment necessary for composting operations to meet the environmental standards described in subsections 2 through 5 and may vary with the method used. For any system other than an in-vessel system, a loader or similar equipment will be necessary to create and turn the pile and to remove finished compost. Systems using active ventilation or piping in the pile will need piping and probably a blower. To monitor temperature, a compost thermometer with a long probe is necessary. Systems may need a meter to monitor pH levels. If large particles and resistant bones are a problem, compost grinding or classification may be necessary. Spreading equipment may also be necessary.

Some specific requirements such as for a sign at the facility can be adapted, as necessary, for a composting facility. A facility not taking a wide variety of wastes, and not open for public use, would only need to indicate the name of the facility, the name and telephone number of the owner and operator, specify on the sign that the facility is only for the animal wastes specified for the facility and have a statement restricting trespassing.

The general facility standards provide general requirements for routine inspection (subs. 8.) and (subs. 9.) control of spillage and windblown waste materials, rubbish, trash or garbage. If animal waste is spilled or scattered, cleanup must be undertaken promptly.

33-20-04.1-03 Plan of Operation. All facilities shall have a plan of operation specific to their facility as follows:

1. The owner or operator must prepare and implement a plan of operation approved by the department that describes the facility's operation to operating personnel and the facility must be operated in accordance with the plan. The operation plan should address the rule requirements and the items generally discussed in this guide for the operation of a nuisance-free composting facility. It is advised that the operation of an animal composting facility will need to be monitored and records kept (see subsection 2, 33-20-04.1-04) on a daily basis to ensure the following:

    a. The waste is limited to only dead birds and any bulking agents or admixtures necessary to promote controlled composting. The operation must screen waste and train employees to ensure that no garbage, trash, etc., is mixed with the compost;

    b. A description of waste handling procedures such as:

        (1) Waste should be segregated at collection points and carefully transported. Mortality should be processed daily;

        (2) A base of litter must be provided. Dead birds and litter plus a carbon-rich bulking agent (such as wood chips, straw, corn cobs, etc.) should be added in layers so that aeration and a carbon to nitrogen ratio is in the range of 15:1 to 35:1 (optimum 23:1) is maintained. Dead birds should be kept six inches from the edges and sealed with litter each day;

        (3) Moisture content of the blended compost material should be maintained between 40 and 60 percent (wet weight basis). Biological activity in the compost pile may become inhibited if the pile is too dry. Too wet a pile may cause anaerobic (lack of air) conditions, resulting in strong odors, a slower composting rate, and possible leachate generation. A good source of clean water should be available for makeup in case of dry conditions;

(4) The temperature must reach a minimum of 130° F. for at least 7 to 10 days in each heat cycle to process the carcasses and kill the pathogens. A temperature drop or an increase above 140° F. indicates it is time to aerate or mix and move the compost. A minimum of two heat cycles are necessary. Adequate temperatures may not be reached during wintertime, thus affecting the viability of the process. The plan should address winter time waste management;

(5) Maintenance of adequate oxygen levels is necessary to ensure proper aerobic biological activity, control temperatures, and control odors. Measures to maintain oxygen levels in the compost include turning the pile as necessary, providing bulking agents, and providing piping into and under the compost to add air; and

(6) Control of odors, flies, or vermin resulting from animal waste composting must be addressed. Serious complaints can be expected as a result of a poorly managed animal carcass composting operation. Enclosing the facility with a roof and screen or using an In-Vessel system, as well as adhering to a detailed operation plan to minimize development of potential nuisances or health and safety threats is prudent. Use of odor or vector control measures, as necessary, should be employed.

c. The facility must be inspected as required by subsection 2 of 33-20-04.1-03. It is advised that the facility be inspected daily when it is in active use for the measures described above and any other measures necessary to provide for controlled composting in accordance with the state rules.

d. Contingencies must be addressed in the event of a fire, leaks, groundwater contamination, other releases (odors, dust, vectors, surface water releases, etc.) or other issues pertinent to the facility. The contingency action procedures should provide details (names, addresses, phone numbers) as to who will respond and what timely measures will be undertaken to address noncompliant conditions. For example, if vectors are noted on a daily inspection, the contingency action identified in the plan might be to call an exterminator that day and have him eradicate the vector problem. During successive days, remedial measures such as turning the compost and installing a screen over and around the pile could be completed. The problem and corrective measures will need to be described in the daily log will be described in the annual report to the department.

e. Leachate removal and management must be addressed. If the system is covered with a roof and no run-on or runoff is feasible, no leachate should migrate from the pile. If a system is to be open to the air, liners, berms, lined

ponds, leachate testing and leachate transport to a disposal facility (such as a nearby Publicly Owned Treatment Works (POTW) should be addressed.

f. Safety procedures and health considerations should be addressed. Composting promotes the growth of the fungus Aspergillus fumigatus which can affect the lungs of compost workers. Other diseases and pathogens are possible if the compost operation is not adequately maintained. The risk of infection to healthy individuals working at compost facilities is relatively low. Individuals who have asthma, diabetes, or suppressed immune systems, however, should not work at a compost facility. The following measures are appropriate:

(1) Workers should be aware that disease-producing microorganisms may be in the work environment. Protective clothing or coveralls should be worn, and employees should wash up before breaks and lunch and at the end of the work period. Contaminated clothing should not be worn home by employees;

(2) Workers must maintain high standards of hygiene such as washing hands before meals, breaks, and before going home;

(3) During dry weather the composting area should be sprinkled with water to prevent dust;

(4) To reduce dust inhalation, workers should wear adequate dust respirators;

(5) Safety shoes and glasses should be worn where necessary; and

(6) The compost facility should not be located near any residences, businesses, or public facilities.

g. Sequential partial closure for landfills - Not Applicable (NA) for compost facilities.

h. Industrial waste procedures for on-site compost facilities only receiving dead animal carcasses need only provide assurances that people handling, transporting and managing the waste will be trained to ensure that unallowed waste will not be managed by the compost facility. A list of unallowed waste might be helpful for training and operation.

2. The owner or operator shall inspect the facility to ensure compliance with the rules and shall keep an inspection log including information such as the date of inspection, the name of the inspector, a notation of observations made, and the date and nature of any repairs or corrective action taken.

Section 33-20-04.1-04. Recordkeeping and reporting. This section states:

1. The facility may not receive waste until the construction has been approved;

2. The owner or operator must keep appropriate records at or near the facility that are available for inspection; and

3. The owner or operator must submit an annual report by March first of each year.

Section 33-20-04.1-05. General closure standards. A compost facility that is well operated will only need to complete the compost operation and land spread the compost as detailed in the plans. The owner/operator should detail what will be done in the eventuality that the facility goes out of business or the process is disrupted. In such a case, the owner/operator should describe how he will remove the waste, transport it, and what facility will handle the waste (such as a local municipal solid waste landfill). As part of the contingency plan, the owner/operator must state what arrangements are made for this eventuality (what landfill, equipment, etc.). A written closure plan and closure documentation is required (see rules).

Chapter 33-20-13 Water Protection Provisions. This Chapter describes the site characterization procedures and, if necessary, the groundwater monitoring provisions. Well sited, designed and operated facilities probably do not need groundwater monitoring. Site with course, sandy soils and a high watertable might need monitoring. The water quality standards reference in this Chapter refer to the North Dakota Century Code chapter 61-28. State law does not allow pollution of waters of the state.

Conclusion: We hope that these guidelines are useful to anyone considering animal carcass composting facilities. Please contact the Division of Waste Management at 701-328-5166 with questions or comments concerning this guideline or any alternative waste management methods.